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Docket No.: GNCA-P02-007

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Re Application of:

Beach, et al.

Serial No: 09/866,557

Filed: May 24, 2001

For: Methods and Compositions for RNA  
Interference

Art Unit: 1632

Attorney Docket No. GNCA-P02-007

Examiner: Not Yet Assigned.

**CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)**

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231

on November 13, 2001  
Date

  
Brent LaBarge

**TRANSMITTAL OF SEQUENCE LISTING IN COMPUTER READABLE FORM**

**IN COMPLIANCE WITH 37 C.F.R. §§1.821(c), (e) AND 1.825(a), (b)**

Box Sequence

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:


This amendment is submitted in response to the Notice to File Missing Parts of Nonprovisional Application mailed from the Patent Office on August 17, 2001.

Transmitted herewith is a copy of a "Sequence Listing" in paper form for the above-identified patent application as required by 37 C.F.R. §§ 1.825(a) and 1.821(c), and a copy of the "Sequence Listing" in computer readable form as required by 37 C.F.R. §§ 1.825(b) and 1.821(e).

As required by 37 C.F.R. § 1.825(b), Applicant's Agent hereby states that the contents of the "Sequence Listing" in paper form and in the computer readable form submitted herewith are the same and, as required by 37 C.F.R. § 1.825(a), also states that the submission includes no new matter.

Respectfully submitted,

ROPES AND GRAY

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#5

SEQUENCE LISTING

<110> Hammond, S.  
Hannon, G.  
Beach, D.

<120> METHODS AND COMPOSITIONS FOR RNA INTERFERENCE

<130> GNCA-P02-007

<140> 09/866,557

<141> 2001-05-24

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<150> 60/243,097

<151> 2000-10-24

<160> 5

<170> PatentIn version 3.1

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Asp Tyr Ser Ser Trp Asp Ala	Met Cys Tyr Leu Asp Pro Ser Lys		
1505	1510	1515	
gct gtt gaa gaa gat gac ttt	gtg gtg ggg ttc tgg aat cca tca	4599	
Ala Val Glu Glu Asp Asp Phe	Val Val Gly Phe Trp Asn Pro Ser		
1520	1525	1530	
gaa gaa aac tgt ggt gtt gac	acg gga aag cag tcc att tct tac	4644	
Glu Glu Asn Cys Gly Val Asp	Thr Gly Lys Gln Ser Ile Ser Tyr		
1535	1540	1545	
gac ttg cac act gag cag tgt	att gct gac aaa agc ata gcg gac	4689	
Asp Leu His Thr Glu Gln Cys	Ile Ala Asp Lys Ser Ile Ala Asp		
1550	1555	1560	
tgt gtg gaa gcc ctg ctg ggc	tgc tat tta acc agc tgt ggg gag	4734	
Cys Val Glu Ala Leu Leu Gly	Cys Tyr Leu Thr Ser Cys Gly Glu		
1565	1570	1575	
agg gct gct cag ctt ttc ctc	tgt tca ctg ggg ctg aag gtg ctc	4779	
Arg Ala Ala Gln Leu Phe Leu	Cys Ser Leu Gly Leu Lys Val Leu		
1580	1585	1590	
ccg gta att aaa agg act gat	cgg gaa aag gcc ctg tgc cct act	4824	
Pro Val Ile Lys Arg Thr Asp	Arg Glu Lys Ala Leu Cys Pro Thr		

1595	1600	1605	
cgg gag aat ttc aac agc	caa caa aag aac ctt	tca gtg agc tgt	4869
Arg Glu Asn Phe Asn Ser	Gln Gln Lys Asn Leu	Ser Val Ser Cys	
1610	1615	1620	
gct gct gct tct gtg gcc	agt tca cgc tct tct	gta ttg aaa gac	4914
Ala Ala Ala Ser Val Ala	Ser Ser Arg Ser Ser	Val Leu Lys Asp	
1625	1630	1635	
tcg gaa tat ggt tgt ttg	aag att cca cca aga	tgt atg ttt gat	4959
Ser Glu Tyr Gly Cys Leu	Lys Ile Pro Pro Arg	Cys Met Phe Asp	
1640	1645	1650	
cat cca gat gca gat aaa	aca ctg aat cac ctt	ata tcg ggg ttt	5004
His Pro Asp Ala Asp Lys	Thr Leu Asn His Leu	Ile Ser Gly Phe	
1655	1660	1665	
gaa aat ttt gaa aag aaa	atc aac tac aga ttc	aag aat aag gct	5049
Glu Asn Phe Glu Lys Lys	Ile Asn Tyr Arg Phe	Lys Asn Lys Ala	
1670	1675	1680	
tac ctt ctc cag gct ttt	aca cat gcc tcc tac	cac tac aat act	5094
Tyr Leu Leu Gln Ala Phe	Thr His Ala Ser Tyr	His Tyr Asn Thr	
1685	1690	1695	
atc act gat tgt tac cag	cgc tta gaa ttc ctg	gga gat gcg att	5139
Ile Thr Asp Cys Tyr Gln	Arg Leu Glu Phe Leu	Gly Asp Ala Ile	
1700	1705	1710	
ttg gac tac ctc ata acc	aag cac ctt tat gaa	gac ccg cgg cag	5184
Leu Asp Tyr Leu Ile Thr	Lys His Leu Tyr Glu	Asp Pro Arg Gln	
1715	1720	1725	
cac tcc ccg ggg gtc ctg	aca gac ctg cgg tct	gcc ctg gtc aac	5229
His Ser Pro Gly Val Leu	Thr Asp Leu Arg Ser	Ala Leu Val Asn	
1730	1735	1740	
aac acc atc ttt gca tcg	ctg gct gta aag tac	gac tac cac aag	5274
Asn Thr Ile Phe Ala Ser	Leu Ala Val Lys Tyr	Asp Tyr His Lys	
1745	1750	1755	
tac ttc aaa gct gtc tct	cct gag ctc ttc cat	gtc att gat gac	5319
Tyr Phe Lys Ala Val Ser	Pro Glu Leu Phe His	Val Ile Asp Asp	
1760	1765	1770	
ttt gtg cag ttt cag ctt	gag aag aat gaa atg	caa gga atg gat	5364
Phe Val Gln Phe Gln Leu	Glu Lys Asn Glu Met	Gln Gly Met Asp	
1775	1780	1785	
tct gag ctt agg aga tct	gag gag gat gaa gag	aaa gaa gag gat	5409
Ser Glu Leu Arg Arg Ser	Glu Glu Asp Glu Glu	Lys Glu Glu Asp	
1790	1795	1800	
att gaa gtt cca aag gcc	atg ggg gat att ttt	gag tcg ctt gct	5454
Ile Glu Val Pro Lys Ala	Met Gly Asp Ile Phe	Glu Ser Leu Ala	
1805	1810	1815	
ggg gcc att tac atg gat	agt ggg atg tca ctg	gag aca gtc tgg	5499
Gly Ala Ile Tyr Met Asp	Ser Gly Met Ser Leu	Glu Thr Val Trp	
1820	1825	1830	
cag gtg tac tat ccc atg	atg cgg cca cta ata	gaa aag ttt tct	5544
Gln Val Tyr Tyr Pro Met	Met Arg Pro Leu Ile	Glu Lys Phe Ser	
1835	1840	1845	
gca aat gta ccc cgt tcc	cct gtg cga gaa ttg	ctt gaa atg gaa	5589
Ala Asn Val Pro Arg Ser	Pro Val Arg Glu Leu	Leu Glu Met Glu	
1850	1855	1860	
cca gaa act gcc aaa ttt	agc ccg gct gag aga	act tac gac ggg	5634
Pro Glu Thr Ala Lys Phe	Ser Pro Ala Glu Arg	Thr Tyr Asp Gly	
1865	1870	1875	
aag gtc aga gtc act gtg	gaa gta gta gga aag	ggg aaa ttt aaa	5679
Lys Val Arg Val Thr Val	Glu Val Val Gly Lys	Gly Lys Phe Lys	



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ggt gtt ggt cga agt tac agg att gcc aaa tct gca gca gca aga			5724
Gly Val Gly Arg Ser Tyr Arg Ile Ala Lys Ser Ala Ala Ala Arg			
1895	1900	1905	
aga gcc ctc cga agc ctc aaa gct aat caa cct cag gtt ccc aat			5769
Arg Ala Leu Arg Ser Leu Lys Ala Asn Gln Pro Gln Val Pro Asn			
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agc tga			5775
Ser			

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Gln Gln Glu Ala Ile His Asp Asn Ile Tyr Thr Pro Arg Lys Tyr Gln  
 35 40 45

Val Glu Leu Leu Glu Ala Ala Leu Asp His Asn Thr Ile Val Cys Leu  
 50 55 60

Asn Thr Gly Ser Gly Lys Thr Phe Ile Ala Ser Thr Thr Leu Leu Lys  
 65 70 75 80

Ser Cys Leu Tyr Leu Asp Leu Gly Glu Thr Ser Ala Arg Asn Gly Lys  
 85 90 95

Arg Thr Val Phe Leu Val Asn Ser Ala Asn Gln Val Ala Gln Gln Val  
 100 105 110

Ser Ala Val Arg Thr His Ser Asp Leu Lys Val Gly Glu Tyr Ser Asn  
 115 120 125

Leu Glu Val Asn Ala Ser Trp Thr Lys Glu Arg Trp Asn Gln Glu Phe  
 130 135 140

Thr Lys His Gln Val Leu Ile Met Thr Cys Tyr Val Ala Leu Asn Val  
 145 150 155 160

Leu Lys Asn Gly Tyr Leu Ser Leu Ser Asp Ile Asn Leu Leu Val Phe  
 165 170 175

Asp Glu Cys His Leu Ala Ile Leu Asp His Pro Tyr Arg Glu Phe Met  
 180 185 190

Lys Leu Cys Glu Ile Cys Pro Ser Cys Pro Arg Ile Leu Gly Leu Thr  
 195 200 205

Ala Ser Ile Leu Asn Gly Lys Trp Asp Pro Glu Asp Leu Glu Glu Lys

210	215	220
Phe Gln Lys Leu Glu Lys Ile Leu Lys Ser Asn Ala Glu Thr Ala Thr		
225	230	235 240
Asp Leu Val Val Leu Asp Arg Tyr Thr Ser Gln Pro Cys Glu Ile Val		
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Val Asp Cys Gly Pro Phe Thr Asp Arg Ser Gly Leu Tyr Glu Arg Leu		
	260	265 270
Leu Met Glu Leu Glu Glu Ala Leu Asn Phe Ile Asn Asp Cys Asn Ile		
	275	280 285
Ser Val His Ser Lys Glu Arg Asp Ser Thr Leu Ile Ser Lys Gln Ile		
	290	295 300
Leu Ser Asp Cys Arg Ala Val Leu Val Val Leu Gly Pro Trp Cys Ala		
305	310	315 320
Asp Lys Val Ala Gly Met Met Val Arg Glu Leu Gln Lys Tyr Ile Lys		
	325	330 335
His Glu Gln Glu Glu Leu His Arg Lys Phe Leu Leu Phe Thr Asp Thr		
	340	345 350
Phe Leu Arg Lys Ile His Ala Leu Cys Glu Glu His Phe Ser Pro Ala		
	355	360 365
Ser Leu Asp Leu Lys Phe Val Thr Pro Lys Val Ile Lys Leu Leu Glu		
	370	375 380
Ile Leu Arg Lys Tyr Lys Pro Tyr Glu Arg His Ser Phe Glu Ser Val		
385	390	395 400
Glu Trp Tyr Asn Asn Arg Asn Gln Asp Asn Tyr Val Ser Trp Ser Asp		
	405	410 415
Ser Glu Asp Asp Asp Glu Asp Glu Glu Ile Glu Glu Lys Glu Lys Pro		
	420	425 430
Glu Thr Asn Phe Pro Ser Pro Phe Thr Asn Ile Leu Cys Gly Ile Ile		
	435	440 445
Phe Val Glu Arg Arg Tyr Thr Ala Val Val Leu Asn Arg Leu Ile Lys		
	450	455 460
Glu Ala Gly Lys Gln Asp Pro Glu Leu Ala Tyr Ile Ser Ser Asn Phe		
465	470	475 480
Ile Thr Gly His Gly Ile Gly Lys Asn Gln Pro Arg Asn Asn Thr Met		
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Glu Ala Glu Phe Arg Lys Gln Glu Glu Val Leu Arg Lys Phe Arg Ala		
	500	505 510
His Glu Thr Asn Leu Leu Ile Ala Thr Ser Ile Val Glu Glu Gly Val		

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Asp	Ile	Pro	Lys	Cys	Asn	Leu	Val	Val	Arg	Phe	Asp	Leu	Pro	Thr	Glu
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Tyr	Arg	Ser	Tyr	Val	Gln	Ser	Lys	Gly	Arg	Ala	Arg	Ala	Pro	Ile	Ser
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Asn	Tyr	Ile	Met	Leu	Ala	Asp	Thr	Asp	Lys	Ile	Lys	Ser	Phe	Glu	Glu
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Asp	Leu	Lys	Thr	Tyr	Lys	Ala	Ile	Glu	Lys	Ile	Leu	Arg	Asn	Lys	Cys
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Ser	Lys	Ser	Val	Asp	Thr	Gly	Glu	Thr	Asp	Ile	Asp	Pro	Val	Met	Asp
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Asp	Asp	His	Val	Phe	Pro	Pro	Tyr	Val	Leu	Arg	Pro	Asp	Asp	Gly	Gly
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Pro	Arg	Val	Thr	Ile	Asn	Thr	Ala	Ile	Gly	His	Ile	Asn	Arg	Tyr	Cys
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Ala	Arg	Leu	Pro	Ser	Asp	Pro	Phe	Thr	His	Leu	Ala	Pro	Lys	Cys	Arg
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Thr	Arg	Glu	Leu	Pro	Asp	Gly	Thr	Phe	Tyr	Ser	Thr	Leu	Tyr	Leu	Pro
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Ile	Asn	Ser	Pro	Leu	Arg	Ala	Ser	Ile	Val	Gly	Pro	Pro	Met	Ser	Cys
			675				680						685		
Val	Arg	Leu	Ala	Glu	Arg	Val	Val	Ala	Leu	Ile	Cys	Cys	Glu	Lys	Leu
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His	Lys	Ile	Gly	Glu	Leu	Asp	Asp	His	Leu	Met	Pro	Val	Gly	Lys	Glu
705						710					715				720
Thr	Val	Lys	Tyr	Glu	Glu	Glu	Leu	Asp	Leu	His	Asp	Glu	Glu	Glu	Thr
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Ser	Val	Pro	Gly	Arg	Pro	Gly	Ser	Thr	Lys	Arg	Arg	Gln	Cys	Tyr	Pro
			740					745					750		
Lys	Ala	Ile	Pro	Glu	Cys	Leu	Arg	Asp	Ser	Tyr	Pro	Arg	Pro	Asp	Gln
			755				760					765			
Pro	Cys	Tyr	Leu	Tyr	Val	Ile	Gly	Met	Val	Leu	Thr	Thr	Pro	Leu	Pro
			770				775					780			
Asp	Glu	Leu	Asn	Phe	Arg	Arg	Arg	Lys	Leu	Tyr	Pro	Pro	Glu	Asp	Thr
785						790					795				800
Thr	Arg	Cys	Phe	Gly	Ile	Leu	Thr	Ala	Lys	Pro	Ile	Pro	Gln	Ile	Pro
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His	Phe	Pro	Val	Tyr	Thr	Arg	Ser	Gly	Glu	Val	Thr	Ile	Ser	Ile	Glu

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Leu Lys Lys Ser Gly Phe Met	Leu Ser Leu Gln Met	Leu Glu Leu Ile
835	840	845
Thr Arg Leu His Gln Tyr Ile	Phe Ser His Ile	Leu Arg Leu Glu Lys
850	855	860
Pro Ala Leu Glu Phe Lys Pro Thr Asp	Ala Asp Ser Ala Tyr Cys Val	
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Lys Phe Met Glu Asp Ile Glu Lys Ser	Glu Ala Arg Ile Gly Ile Pro	
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Ser Thr Lys Tyr Thr Lys Glu Thr Pro	Phe Val Phe Lys Leu Glu Asp	
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Tyr Gln Asp Ala Val Ile Ile Pro Arg	Tyr Arg Asn Phe Asp Gln Pro	
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His Arg Phe Tyr Val Ala Asp Val Tyr	Thr Asp Leu Thr Pro Leu Ser	
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Lys Phe Pro Ser Pro Glu Tyr Glu Thr	Phe Ala Glu Tyr Tyr Lys Thr	
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Lys Tyr Asn Leu Asp Leu Thr Asn Leu	Asn Gln Pro Leu Leu Asp Val	
	980	985
Asp His Thr Ser Ser Arg Leu Asn	Leu Leu Thr Pro Arg His Leu Asn	
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Gln Lys Gly Lys Ala Leu Pro	Leu Ser Ser Ala Glu Lys Arg Lys	
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Ala Lys Trp Glu Ser Leu Gln	Asn Lys Gln Ile Leu Val Pro Glu	
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Leu Cys Ala Ile His Pro Ile	Pro Ala Ser Leu Trp Arg Lys Ala	
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Val Cys Leu Pro Ser Ile Leu	Tyr Arg Leu His Cys Leu Leu Thr	
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Ala Glu Glu Leu Arg Ala Gln	Thr Ala Ser Asp Ala Gly Val Gly	
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Val Arg Ser Leu Pro Ala Asp	Phe Arg Tyr Pro Asn Leu Asp Phe	
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Gly Trp Lys Lys Ser Ile Asp	Ser Lys Ser Phe Ile Ser Ile Ser	
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Asn Ser Ser Ser Ala Glu Asn	Asp Asn Tyr Cys Lys His Ser Thr	

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Ile Val Pro Glu Asn Ala	Ala His Gln Gly Ala	Asn Arg Thr Ser
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Ser Leu Glu Asn His Asp	Gln Met Ser Val Asn	Cys Arg Thr Leu
1145	1150	1155
Leu Ser Glu Ser Pro Gly	Lys Leu His Val Glu	Val Ser Ala Asp
1160	1165	1170
Leu Thr Ala Ile Asn Gly	Leu Ser Tyr Asn Gln	Asn Leu Ala Asn
1175	1180	1185
Gly Ser Tyr Asp Leu Ala	Asn Arg Asp Phe Cys	Gln Gly Asn Gln
1190	1195	1200
Leu Asn Tyr Tyr Lys Gln	Glu Ile Pro Val Gln	Pro Thr Thr Ser
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Tyr Ser Ile Gln Asn Leu	Tyr Ser Tyr Glu Asn	Gln Pro Gln Pro
1220	1225	1230
Ser Asp Glu Cys Thr Leu	Leu Ser Asn Lys Tyr	Leu Asp Gly Asn
1235	1240	1245
Ala Asn Lys Ser Thr Ser	Asp Gly Ser Pro Val	Met Ala Val Met
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Pro Gly Thr Thr Asp Thr	Ile Gln Val Leu Lys	Gly Arg Met Asp
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Ser Glu Gln Ser Pro Ser	Ile Gly Tyr Ser Ser	Arg Thr Leu Gly
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Pro Asn Pro Gly Leu Ile	Leu Gln Ala Leu Thr	Leu Ser Asn Ala
1295	1300	1305
Ser Asp Gly Phe Asn Leu	Glu Arg Leu Glu Met	Leu Gly Asp Ser
1310	1315	1320
Phe Leu Lys His Ala Ile	Thr Thr Tyr Leu Phe	Cys Thr Tyr Pro
1325	1330	1335
Asp Ala His Glu Gly Arg	Leu Ser Tyr Met Arg	Ser Lys Lys Val
1340	1345	1350
Ser Asn Cys Asn Leu Tyr	Arg Leu Gly Lys Lys	Lys Gly Leu Pro
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Ser Arg Met Val Val Ser	Ile Phe Asp Pro Pro	Val Asn Trp Leu
1370	1375	1380
Pro Pro Gly Tyr Val Val	Asn Gln Asp Lys Ser	Asn Thr Asp Lys
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Trp Glu Lys Asp Glu Met	Thr Lys Asp Cys Met	Leu Ala Asn Gly

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Phe Leu Glu Tyr Asp Gln	Glu His Ile Arg Phe	Ile Asp Asn Met		
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Leu Met Gly Ser Gly Ala	Phe Val Lys Lys Ile	Ser Leu Ser Pro		
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Phe Ser Thr Thr Asp Ser	Ala Tyr Glu Trp Lys	Met Pro Lys Lys		
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Ser Ser Leu Gly Ser Met	Pro Phe Ser Ser Asp	Phe Glu Asp Phe		
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Glu Glu Asn Cys Gly Val	Asp Thr Gly Lys Gln	Ser Ile Ser Tyr		
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Asp Leu His Thr Glu Gln	Cys Ile Ala Asp Lys	Ser Ile Ala Asp		
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Arg Glu Asn Phe Asn Ser	Gln Gln Lys Asn Leu	Ser Val Ser Cys		
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Ala Ala Ala Ser Val Ala	Ser Ser Arg Ser Ser	Val Leu Lys Asp		
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Ser Glu Tyr Gly Cys Leu	Lys Ile Pro Pro Arg	Cys Met Phe Asp		
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Glu Asn Phe Glu Lys Lys	Ile Asn Tyr Arg Phe	Lys Asn Lys Ala		
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Tyr Leu Leu Gln Ala Phe	Thr His Ala Ser Tyr	His Tyr Asn Thr		

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1790						1795					1800			
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Gln	Val	Tyr	Tyr	Pro	Met	Met	Arg	Pro	Leu	Ile	Glu	Lys	Phe	Ser
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Thr Ile Ile Cys Leu Gly His Arg Ser Ser Lys Glu Phe Ile Ala Leu	
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Ser Val Tyr Leu Ser Cys Glu Val Gly Thr Ser Thr Glu Pro Cys Ser	
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atc tac acg atg ctc acc cac ttg act gac ctg cgg gtg tgg cag gag	288
Ile Tyr Thr Met Leu Thr His Leu Thr Asp Leu Arg Val Trp Gln Glu	
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cag ccg gat atg caa att ccc ttt gat cat tgc tgg acg gac tat cac	336
Gln Pro Asp Met Gln Ile Pro Phe Asp His Cys Trp Thr Asp Tyr His	
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gtt tcc atc cta cgg cca gag gga ttt ctt tat ctg ctc gaa act cgc	384
Val Ser Ile Leu Arg Pro Glu Gly Phe Leu Tyr Leu Leu Glu Thr Arg	
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Glu Leu Leu Leu Ser Ser Val Glu Leu Ile Val Leu Glu Asp Cys His	
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Asp Ser Ala Val Tyr Gln Arg Ile Arg Pro Leu Phe Glu Asn His Ile	
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Met Pro Ala Pro Pro Ala Asp Arg Pro Arg Ile Leu Gly Leu Ala Gly	
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Pro Leu His Ser Ala Gly Cys Glu Leu Gln Gln Leu Ser Ala Met Leu	
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				355			
ttg	cag	aca	ctg	agg	tgc	ttc	aag
Leu	Gln	Thr	Leu	Arg	Cys	Phe	Lys
						375	
gac	gga	ctg	cgc	aga	atg	cgg	cat
Asp	Gly	Leu	Arg	Arg	Met	Arg	His
					390		
cgg	tta	tct	cat	acg	ctg	gaa	agc
Arg	Leu	Ser	His	Thr	Leu	Glu	Ser
				405			
gac	caa	ccg	ccg	acg	gag	aca	cga
Asp	Gln	Pro	Pro	Thr	Glu	Thr	Arg
				420			
att	ctg	cac	acg	aca	gag	gac	agg
Ile	Leu	His	Thr	Thr	Glu	Asp	Arg
				435			
gtg	act	cct	act	cct	act	ccc	gct
Val	Thr	Pro	Thr	Pro	Thr	Pro	Ala
						455	
ggg	gcc	aac	act	gca	caa	cca	cga
Gly	Ala	Asn	Thr	Ala	Gln	Pro	Arg
						470	
cgc	cac	cac	cgg	gat	cac	aat	gat
Arg	His	His	Arg	Asp	His	Asn	Asp
				485			
att	tac	tgc	aac	cag	aac	cac	acg
Ile	Tyr	Cys	Asn	Gln	Asn	His	Thr
				500			
gcg	gag	att	agc	aga	cgt	gat	ccc
Ala	Glu	Ile	Ser	Arg	Arg	Asp	Pro
				515			
tac	acc	acg	gac	cgg	gtg	gca	gat
Tyr	Thr	Thr	Asp	Arg	Val	Ala	Asp
				530			
gag	ttg	gag	cac	cgg	cgg	cag	gaa
Glu	Leu	Glu	His	Arg	Arg	Gln	Glu
						550	
cat	gac	tgc	aat	gtc	ctg	atc	ggg
His	Asp	Cys	Asn	Val	Leu	Ile	Gly
				565			
gat	gtg	ccc	aag	tgc	aat	ttg	gtt
Asp	Val	Pro	Lys	Cys	Asn	Leu	Val

912

960

1008

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1104

1152

1200

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1296

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1392

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1488

1536

1584

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1680

1728

1776

			580				585				590							
tat	cgc	agt	tac	gtt	cag	tgc	aaa	ggg	cga	gcc	cgt	gct	gct	cca	gcc	1824		
Tyr	Arg	Ser	Tyr	Val	Gln	Cys	Lys	Gly	Arg	Ala	Arg	Ala	Ala	Pro	Ala			
			595				600				605							
tat	cat	gtc	att	ctc	gtc	gct	ccg	agt	tat	aaa	agc	cca	act	gtg	ggg	1872		
Tyr	His	Val	Ile	Leu	Val	Ala	Pro	Ser	Tyr	Lys	Ser	Pro	Thr	Val	Gly			
			610				615				620							
tca	gtg	cag	ctg	acc	gat	cgg	agt	cat	cgg	tat	att	tgc	gcg	act	ggg	1920		
Ser	Val	Gln	Leu	Thr	Asp	Arg	Ser	His	Arg	Tyr	Ile	Cys	Ala	Thr	Gly			
			625				630				635				640			
gat	act	aca	gag	gcg	gac	agc	gac	tct	gat	gat	tca	gcg	atg	cca	aac	1968		
Asp	Thr	Thr	Glu	Ala	Asp	Ser	Asp	Ser	Asp	Asp	Ser	Ala	Met	Pro	Asn			
			645				650				655							
tcg	tcc	ggc	tcg	gat	ccc	tat	act	ttt	ggc	acg	gca	cgc	gga	acc	gtg	2016		
Ser	Ser	Gly	Ser	Asp	Pro	Tyr	Thr	Phe	Gly	Thr	Ala	Arg	Gly	Thr	Val			
			660				665				670							
aag	atc	ctc	aac	ccc	gaa	gtg	ttc	agt	aaa	caa	cca	ccg	aca	gcg	tgc	2064		
Lys	Ile	Leu	Asn	Pro	Glu	Val	Phe	Ser	Lys	Gln	Pro	Pro	Thr	Ala	Cys			
			675				680				685							
gac	att	aag	ctg	cag	gag	atc	cag	gac	gaa	ttg	cca	gcc	gca	gcg	cag	2112		
Asp	Ile	Lys	Leu	Gln	Glu	Ile	Gln	Asp	Glu	Leu	Pro	Ala	Ala	Ala	Gln			
			690				695				700							
ctg	gat	acg	agc	aac	tcc	agc	gac	gaa	gcc	gtc	agc	atg	agt	aac	acg	2160		
Leu	Asp	Thr	Ser	Asn	Ser	Ser	Asp	Glu	Ala	Val	Ser	Met	Ser	Asn	Thr			
			705				710				715				720			
tct	cca	agc	gag	agc	agt	aca	gaa	caa	aaa	tcc	aga	cgc	ttc	cag	tgc	2208		
Ser	Pro	Ser	Glu	Ser	Ser	Thr	Glu	Gln	Lys	Ser	Arg	Arg	Phe	Gln	Cys			
			725				730				735							
gag	ctg	agc	tct	tta	acg	gag	cca	gaa	gac	aca	agt	gat	act	aca	gcc	2256		
Glu	Leu	Ser	Ser	Leu	Thr	Glu	Pro	Glu	Asp	Thr	Ser	Asp	Thr	Thr	Ala			
			740				745				750							
gaa	atc	gat	act	gct	cat	agt	tta	gcc	agc	acc	acg	aag	gac	ttg	gtg	2304		
Glu	Ile	Asp	Thr	Ala	His	Ser	Leu	Ala	Ser	Thr	Thr	Lys	Asp	Leu	Val			
			755				760				765							
cat	caa	atg	gca	cag	tat	cgc	gaa	atc	gag	cag	atg	ctg	cta	tcc	aag	2352		
His	Gln	Met	Ala	Gln	Tyr	Arg	Glu	Ile	Glu	Gln	Met	Leu	Leu	Ser	Lys			
			770				775				780							
tgc	gcc	aac	aca	gag	ccg	ccg	gag	cag	gag	cag	agt	gag	gcg	gaa	cgt	2400		
Cys	Ala	Asn	Thr	Glu	Pro	Pro	Glu	Gln	Glu	Gln	Ser	Glu	Ala	Glu	Arg			
			785				790				795				800			
ttt	agt	gcc	tgc	ctg	gcc	gca	tac	cga	ccc	aag	ccg	cac	ctg	cta	aca	2448		
Phe	Ser	Ala	Cys	Leu	Ala	Ala	Tyr	Arg	Pro	Lys	Pro	His	Leu	Leu	Thr			
			805				810				815							
ggc	gcc	tcc	gtg	gat	ctg	ggg	tct	gct	ata	gct	ttg	gtc	aac	aag	tac	2496		
Gly	Ala	Ser	Val	Asp	Leu	Gly	Ser	Ala	Ile	Ala	Leu	Val	Asn	Lys	Tyr			
			820				825				830							
tgc	gcc	cga	ctg	cca	agc	gac	acg	ttc	acc	aag	ttg	acg	gcg	ttg	tgg	2544		
Cys	Ala	Arg	Leu	Pro	Ser	Asp	Thr	Phe	Thr	Lys	Leu	Thr	Ala	Leu	Trp			
			835				840				845							
cgc	tgc	acc	cga	aac	gaa	agg	gct	gga	gtg	acc	ctg	ttt	cag	tac	aca	2592		
Arg	Cys	Thr	Arg	Asn	Glu	Arg	Ala	Gly	Val	Thr	Leu	Phe	Gln	Tyr	Thr			
			850				855				860							
ctc	cgt	ctg	ccc	atc	aac	tcg	cca	ttg	aag	cat	gac	att	gtg	ggg	ctt	2640		
Leu	Arg	Leu	Pro	Ile	Asn	Ser	Pro	Leu	Lys	His	Asp	Ile	Val	Gly	Leu			
			865				870				875				880			
ccg	atg	cca	act	caa	aca	ttg	gcc	cgc	cga	ctg	gct	gcc	ttg	cag	gct	2688		
Pro	Met	Pro	Thr	Gln	Thr	Leu	Ala	Arg	Arg	Leu	Ala	Ala	Leu	Gln	Ala			

	885	890	895	
tgc gtg gaa ctg cac agg atc ggt gag tta gac gat cag ttg cag cct				2736
Cys Val Glu Leu His Arg Ile Gly Glu Leu Asp Asp Gln Leu Gln Pro				
	900	905	910	
atc ggc aag gag gga ttt cgt gcc ctg gag ccg gac tgg gag tgc ttt				2784
Ile Gly Lys Glu Gly Phe Arg Ala Leu Glu Pro Asp Trp Glu Cys Phe				
	915	920	925	
gaa ctg gag cca gag gac gaa cag att gtg cag cta agc gat gaa cca				2832
Glu Leu Glu Pro Glu Asp Glu Gln Ile Val Gln Leu Ser Asp Glu Pro				
	930	935	940	
cgt ccg gga aca acc aag cgt cgt cag tac tat tac aaa cgc att gca				2880
Arg Pro Gly Thr Thr Lys Arg Arg Gln Tyr Tyr Tyr Lys Arg Ile Ala				
	945	950	955	960
tcc gaa ttt tgc gat tgc cgt ccc gtt gcc gga gcg cca tgc tat ttg				2928
Ser Glu Phe Cys Asp Cys Arg Pro Val Ala Gly Ala Pro Cys Tyr Leu				
	965	970	975	
tac ttt atc caa ctg acg ctc caa tgt ccg att ccc gaa gag caa aac				2976
Tyr Phe Ile Gln Leu Thr Leu Gln Cys Pro Ile Pro Glu Glu Gln Asn				
	980	985	990	
acg cgg gga cgc aag att tat ccg ccc gaa gat gcg cag cag gga ttc				3024
Thr Arg Gly Arg Lys Ile Tyr Pro Pro Glu Asp Ala Gln Gln Gly Phe				
	995	1000	1005	
ggc att cta acc acc aaa cgg ata ccc aag ctg agt gct ttc tcg				3069
Gly Ile Leu Thr Thr Lys Arg Ile Pro Lys Leu Ser Ala Phe Ser				
	1010	1015	1020	
ata ttc acg cgt tcc ggt gag gtg aag gtt tcc ctg gag tta gct				3114
Ile Phe Thr Arg Ser Gly Glu Val Lys Val Ser Leu Glu Leu Ala				
	1025	1030	1035	
aag gaa cgc gtg att cta act agc gaa caa ata gtc tgc atc aac				3159
Lys Glu Arg Val Ile Leu Thr Ser Glu Gln Ile Val Cys Ile Asn				
	1040	1045	1050	
gga ttt tta aac tac acg ttc acc aat gta ctg cgt ttg caa aag				3204
Gly Phe Leu Asn Tyr Thr Phe Thr Asn Val Leu Arg Leu Gln Lys				
	1055	1060	1065	
ttt ctg atg ctc ttc gat ccg gac tcc acg gaa aat tgt gta ttc				3249
Phe Leu Met Leu Phe Asp Pro Asp Ser Thr Glu Asn Cys Val Phe				
	1070	1075	1080	
att gtg ccc acc gtg aag gca cca gct ggc ggc aag cac atc gac				3294
Ile Val Pro Thr Val Lys Ala Pro Ala Gly Gly Lys His Ile Asp				
	1085	1090	1095	
tgg cag ttt ctg gag ctg atc caa gcg aat gga aat aca atg cca				3339
Trp Gln Phe Leu Glu Leu Ile Gln Ala Asn Gly Asn Thr Met Pro				
	1100	1105	1110	
cgg gca gtg ccc gat gag gag cgc cag gcg cag ccg ttt gat ccg				3384
Arg Ala Val Pro Asp Glu Glu Arg Gln Ala Gln Pro Phe Asp Pro				
	1115	1120	1125	
caa cgc ttc cag gat gcc gtc gtt atg ccg tgg tat cgc aac cag				3429
Gln Arg Phe Gln Asp Ala Val Val Met Pro Trp Tyr Arg Asn Gln				
	1130	1135	1140	
gat caa ccg cag tat ttc tat gtg gcg gag ata tgt cca cat cta				3474
Asp Gln Pro Gln Tyr Phe Tyr Val Ala Glu Ile Cys Pro His Leu				
	1145	1150	1155	
tcc cca ctc agc tgc ttc cct ggt gac aac tac cgc acg ttc aag				3519
Ser Pro Leu Ser Cys Phe Pro Gly Asp Asn Tyr Arg Thr Phe Lys				
	1160	1165	1170	
cac tac tac ctc gtc aag tat ggt ctg acc ata cag aat acc tcg				3564
His Tyr Tyr Leu Val Lys Tyr Gly Leu Thr Ile Gln Asn Thr Ser				

1175		1180		1185	
cag ccg cta ttg gac gtg	gat cac acc agt gcg cgg tta aac ttc	3609			
Gln Pro Leu Leu Asp Val	Asp His Thr Ser Ala Arg Leu Asn Phe				
1190	1195	1200			
ctc acg cca cga tac gtt	aat cgc aag ggc gtt gct ctg ccc act	3654			
Leu Thr Pro Arg Tyr Val	Asn Arg Lys Gly Val Ala Leu Pro Thr				
1205	1210	1215			
agt tcg gag gag aca aag	cgg gca aag cgc gag aat ctc gaa cag	3699			
Ser Ser Glu Glu Thr Lys	Arg Ala Lys Arg Glu Asn Leu Glu Gln				
1220	1225	1230			
aag cag atc ctt gtg cca	gag ctc tgc act gtg cat cca ttc ccc	3744			
Lys Gln Ile Leu Val Pro	Glu Leu Cys Thr Val His Pro Phe Pro				
1235	1240	1245			
gcc tcc ttg tgg cga act	gcc gtg tgc ctg ccc tgc atc ctg tac	3789			
Ala Ser Leu Trp Arg Thr	Ala Val Cys Leu Pro Cys Ile Leu Tyr				
1250	1255	1260			
cgc ata aat ggt ctt cta	ttg gcc gac gat att cgg aaa cag gtt	3834			
Arg Ile Asn Gly Leu Leu	Leu Ala Asp Asp Ile Arg Lys Gln Val				
1265	1270	1275			
tct gcg gat ctg ggg ctg	gga agg caa cag atc gaa gat gag gat	3879			
Ser Ala Asp Leu Gly Leu	Gly Arg Gln Gln Ile Glu Asp Glu Asp				
1280	1285	1290			
ttc gag tgg ccc atg ctg	gac ttt ggg tgg agt cta tcg gag gtg	3924			
Phe Glu Trp Pro Met Leu	Asp Phe Gly Trp Ser Leu Ser Glu Val				
1295	1300	1305			
ctc aag aaa tcg cgg gag	tcc aaa caa aag gag tcc ctt aag gat	3969			
Leu Lys Lys Ser Arg Glu	Ser Lys Gln Lys Glu Ser Leu Lys Asp				
1310	1315	1320			
gat act att aat ggc aaa	gac tta gct gat gtt gaa aag aaa ccg	4014			
Asp Thr Ile Asn Gly Lys	Asp Leu Ala Asp Val Glu Lys Lys Pro				
1325	1330	1335			
act agc gag gag acc caa	cta gat aag gat tca aaa gac gat aag	4059			
Thr Ser Glu Glu Thr Gln	Leu Asp Lys Asp Ser Lys Asp Asp Lys				
1340	1345	1350			
gtt gag aaa agt gct att	gaa cta atc att gag gga gag gag aag	4104			
Val Glu Lys Ser Ala Ile	Glu Leu Ile Ile Glu Gly Glu Glu Lys				
1355	1360	1365			
ctg caa gag gct gat gac	ttc att gag ata ggc act tgg tca aac	4149			
Leu Gln Glu Ala Asp Asp	Phe Ile Glu Ile Gly Thr Trp Ser Asn				
1370	1375	1380			
gat atg gcc gac gat ata	gct agt ttt aac caa gaa gac gac gac	4194			
Asp Met Ala Asp Asp Ile	Ala Ser Phe Asn Gln Glu Asp Asp Asp				
1385	1390	1395			
gag gat gac gcc ttc cat	ctc cca gtt tta ccg gca aac gtt aag	4239			
Glu Asp Asp Ala Phe His	Leu Pro Val Leu Pro Ala Asn Val Lys				
1400	1405	1410			
ttc tgt gat cag caa acg	cgc tac ggt tcg ccc aca ttt tgg gat	4284			
Phe Cys Asp Gln Gln Thr	Arg Tyr Gly Ser Pro Thr Phe Trp Asp				
1415	1420	1425			
gtg agc aat ggc gaa agc	ggc ttc aag ggt cca aag agc agt cag	4329			
Val Ser Asn Gly Glu Ser	Gly Phe Lys Gly Pro Lys Ser Ser Gln				
1430	1435	1440			
aat aag cag ggt ggc aag	ggc aaa gca aag ggt ccg gca aag ccc	4374			
Asn Lys Gln Gly Gly Lys	Gly Lys Ala Lys Gly Pro Ala Lys Pro				
1445	1450	1455			
aca ttt aac tat tat gac	tcg gac aat tcg ctg ggt tcc agc tac	4419			
Thr Phe Asn Tyr Tyr Asp	Ser Asp Asn Ser Leu Gly Ser Ser Tyr				

1460	gat gac gac gat aac gca ggt ccg ctc aat tac atg cat cac aac	4464
Asp Asp Asp Asp Asn Ala Gly Pro Leu Asn Tyr Met His His Asn		
1475	1480	1485
tac agt tcg gat gac gac gat gtg gca gat gat atc gat gcg gga	4509	
Tyr Ser Ser Asp Asp Asp Asp Val Ala Asp Asp Ile Asp Ala Gly		
1490	1495	1500
cgc att gcg ttc acc tcc aag aat gaa gcg gag act att gaa acc	4554	
Arg Ile Ala Phe Thr Ser Lys Asn Glu Ala Glu Thr Ile Glu Thr		
1505	1510	1515
gca cag gaa gtg gaa aag cgc cag aag cag ctg tcc atc atc cag	4599	
Ala Gln Glu Val Glu Lys Arg Gln Lys Gln Leu Ser Ile Ile Gln		
1520	1525	1530
gcg acc aat gct aac gag cgg cag tat cag cag aca aag aac ctg	4644	
Ala Thr Asn Ala Asn Glu Arg Gln Tyr Gln Gln Thr Lys Asn Leu		
1535	1540	1545
ctc att gga ttc aat ttt aag cat gag gac cag aag gaa cct gcc	4689	
Leu Ile Gly Phe Asn Phe Lys His Glu Asp Gln Lys Glu Pro Ala		
1550	1555	1560
act ata aga tat gaa gaa tcc ata gct aag ctc aaa acg gaa ata	4734	
Thr Ile Arg Tyr Glu Glu Ser Ile Ala Lys Leu Lys Thr Glu Ile		
1565	1570	1575
gaa tcc ggc ggc atg ttg gtg ccg cac gac cag cag ttg gtt cta	4779	
Glu Ser Gly Gly Met Leu Val Pro His Asp Gln Gln Leu Val Leu		
1580	1585	1590
aaa aga agt gat gcc gct gag gct cag gtt gca aag gta tcg atg	4824	
Lys Arg Ser Asp Ala Ala Glu Ala Gln Val Ala Lys Val Ser Met		
1595	1600	1605
atg gag cta ttg aag cag ctg ctg ccg tat gta aat gaa gat gtg	4869	
Met Glu Leu Leu Lys Gln Leu Leu Pro Tyr Val Asn Glu Asp Val		
1610	1615	1620
ctg gcc aaa aag ctg ggt gat agg cgc gag ctt ctg ctg tcg gat	4914	
Leu Ala Lys Lys Leu Gly Asp Arg Arg Glu Leu Leu Leu Ser Asp		
1625	1630	1635
ttg gta gag cta aat gca gat tgg gta gcg cga cat gag cag gag	4959	
Leu Val Glu Leu Asn Ala Asp Trp Val Ala Arg His Glu Gln Glu		
1640	1645	1650
acc tac aat gta atg gga tgc gga gat agt ttt gac aac tat aac	5004	
Thr Tyr Asn Val Met Gly Cys Gly Asp Ser Phe Asp Asn Tyr Asn		
1655	1660	1665
gat cat cat cgg ctg aac ttg gat gaa aag caa ctg aaa ctg caa	5049	
Asp His His Arg Leu Asn Leu Asp Glu Lys Gln Leu Lys Leu Gln		
1670	1675	1680
tac gaa cga att gaa att gag cca cct act tcc acg aag gcc ata	5094	
Tyr Glu Arg Ile Glu Ile Glu Pro Pro Thr Ser Thr Lys Ala Ile		
1685	1690	1695
acc tca gcc ata tta cca gct ggc ttc agt ttc gat cga caa ccg	5139	
Thr Ser Ala Ile Leu Pro Ala Gly Phe Ser Phe Asp Arg Gln Pro		
1700	1705	1710
gat cta gtg ggc cat cca gga ccc agt ccc agc atc att ttg caa	5184	
Asp Leu Val Gly His Pro Gly Pro Ser Pro Ser Ile Ile Leu Gln		
1715	1720	1725
gcc ctc aca atg tcc aat gct aac gat ggc atc aat ctg gag cga	5229	
Ala Leu Thr Met Ser Asn Ala Asn Asp Gly Ile Asn Leu Glu Arg		
1730	1735	1740
ctg gag aca att gga gat tcc ttt cta aag tat gcc att acc acc	5274	
Leu Glu Thr Ile Gly Asp Ser Phe Leu Lys Tyr Ala Ile Thr Thr		

1745	tac ttg tac atc acc tac	1750	gag aat gtg cac gag	1755	gga aaa cta agt	5319
Tyr Leu Tyr Ile Thr Tyr	Glu Asn Val His Glu	Gly Lys Leu Ser				
1760	cac ctg cgc tcc aag cag	1765	gtt gcc aat ctc aat	1770	ctc tat cgt ctg	5364
His Leu Arg Ser Lys Gln	Val Ala Asn Leu Asn	Leu Tyr Arg Leu				
1775	ggc aga cgt aag aga ctg	1780	ggt gaa tat atg ata	1785	gcc act aaa ttc	5409
Gly Arg Arg Lys Arg Leu	Gly Glu Tyr Met Ile	Ala Thr Lys Phe				
1790	gag ccg cac gac aat tgg	1795	ctg cca ccc tgc tac	1800	tac gtg cca aag	5454
Glu Pro His Asp Asn Trp	Leu Pro Pro Cys Tyr	Tyr Val Pro Lys				
1805	gag cta gag aag gcg ctc	1810	atc gag gcg aag atc	1815	ccc act cac cat	5499
Glu Leu Glu Lys Ala Leu	Ile Glu Ala Lys Ile	Pro Thr His His				
1820	tgg aag ctg gcc gat ctg	1825	cta gac att aag aac	1830	cta agc agt gtg	5544
Trp Lys Leu Ala Asp Leu	Leu Asp Ile Lys Asn	Leu Ser Ser Val				
1835	caa atc tgc gag atg gtt	1840	cgc gaa aaa gcc gat	1845	gcc ctg ggc ttg	5589
Gln Ile Cys Glu Met Val	Arg Glu Lys Ala Asp	Ala Leu Gly Leu				
1850	gag cag aat ggg ggt gcc	1855	caa aat gga caa ctt	1860	gac gac tcc aat	5634
Glu Gln Asn Gly Gly Ala	Gln Asn Gly Gln Leu	Asp Asp Ser Asn				
1865	gat agc tgc aat gat ttt	1870	agc tgt ttt att ccc	1875	tac aac ctt gtt	5679
Asp Ser Cys Asn Asp Phe	Ser Cys Phe Ile Pro	Tyr Asn Leu Val				
1880	tcg caa cac agc att ccg	1885	gat aag tct att gcc	1890	gat tgc gtc gaa	5724
Ser Gln His Ser Ile Pro	Asp Lys Ser Ile Ala	Asp Cys Val Glu				
1895	gcc ctc att gga gcc tat	1900	ctc att gag tgc gga	1905	ccc cga ggg gct	5769
Ala Leu Ile Gly Ala Tyr	Leu Ile Glu Cys Gly	Pro Arg Gly Ala				
1910	tta ctc ttt atg gcc tgg	1915	ctg ggc gtg aga gtg	1920	ctc cct atc aca	5814
Leu Leu Phe Met Ala Trp	Leu Gly Val Arg Val	Leu Pro Ile Thr				
1925	agg cag ttg gac ggg ggt	1930	aac cag gag caa cga	1935	ata ccc ggt agc	5859
Arg Gln Leu Asp Gly Gly	Asn Gln Glu Gln Arg	Ile Pro Gly Ser				
1940	aca aaa ccg aat gcc gaa	1945	aat gtg gtc acc gtt	1950	tac ggt gca tgg	5904
Thr Lys Pro Asn Ala Glu	Asn Val Val Thr Val	Tyr Gly Ala Trp				
1955	ccc acg ccg cgt agt cca	1960	ctg ctg cac ttt gct	1965	cca aat gct acg	5949
Pro Thr Pro Arg Ser Pro	Leu Leu His Phe Ala	Pro Asn Ala Thr				
1970	gag gag ctg gac cag tta	1975	cta agc ggc ttt gag	1980	gag ttt gag gag	5994
Glu Glu Leu Asp Gln Leu	Leu Ser Gly Phe Glu	Glu Phe Glu Glu				
1985	agt ttg gga tac aag ttc	1990	cgg gat cgg tcg tac	1995	ctg ttg caa gcc	6039
Ser Leu Gly Tyr Lys Phe	Arg Asp Arg Ser Tyr	Leu Leu Gln Ala				
2000	atg aca cat gcc agt tac	2005	acg ccc aat cga ttg	2010	acg gat tgc tat	6084
Met Thr His Ala Ser Tyr	Thr Pro Asn Arg Leu	Thr Asp Cys Tyr				
2015	cag cgt ctg gag ttc ctg	2020	ggc gat gct gtt cta	2025	gat tac ctc att	6129
Gln Arg Leu Glu Phe Leu	Gly Asp Ala Val Leu	Asp Tyr Leu Ile				

2030	2035	2040	
acg cgg cat tta tac gaa	gat ccc cgc cag cat	tct cca ggc gca	6174
Thr Arg His Leu Tyr Glu	Asp Pro Arg Gln His	Ser Pro Gly Ala	
2045	2050	2055	
tta acg gat ttg cgg tca	gca ctg gtg aat aat	aca ata ttc gcc	6219
Leu Thr Asp Leu Arg Ser	Ala Leu Val Asn Asn	Thr Ile Phe Ala	
2060	2065	2070	
tcc ctg gct gtt cgc cat	ggc ttc cac aag ttc	ttc cgg cac ctc	6264
Ser Leu Ala Val Arg His	Gly Phe His Lys Phe	Phe Arg His Leu	
2075	2080	2085	
tcg ccg ggc ctt aac gat	gtg att gac cgt ttt	gtg cgg atc cag	6309
Ser Pro Gly Leu Asn Asp	Val Ile Asp Arg Phe	Val Arg Ile Gln	
2090	2095	2100	
cag gag aat gga cac tgc	atc agt gag gag tac	tac tta ttg tcc	6354
Gln Glu Asn Gly His Cys	Ile Ser Glu Glu Tyr	Tyr Leu Leu Ser	
2105	2110	2115	
gag gag gag tgc gat gac	gcc gag gac gtt gag	gtg ccc aag gca	6399
Glu Glu Glu Cys Asp Asp	Ala Glu Asp Val Glu	Val Pro Lys Ala	
2120	2125	2130	
ttg ggc gac gtt ttc gag	tcg atc gca ggt gcc	att ttt ctc gac	6444
Leu Gly Asp Val Phe Glu	Ser Ile Ala Gly Ala	Ile Phe Leu Asp	
2135	2140	2145	
tca aac atg tcg ctg gac	gtg gtt tgg cac gta	tat agc aac atg	6489
Ser Asn Met Ser Leu Asp	Val Val Trp His Val	Tyr Ser Asn Met	
2150	2155	2160	
atg agc ccg gag atc gag	cag ttc agc aac tca	gtg cca aaa tcg	6534
Met Ser Pro Glu Ile Glu	Gln Phe Ser Asn Ser	Val Pro Lys Ser	
2165	2170	2175	
ccc att cgg gag ctc ctc	gag ctg gag ccg gaa	acc gcc aag ttc	6579
Pro Ile Arg Glu Leu Leu	Glu Leu Glu Pro Glu	Thr Ala Lys Phe	
2180	2185	2190	
ggc aag ccc gag aag ctg	gcg gat ggg cga cgg	gtg cgc gtt acc	6624
Gly Lys Pro Glu Lys Leu	Ala Asp Gly Arg Arg	Val Arg Val Thr	
2195	2200	2205	
gtg gat gtc ttc tgc aaa	gga acc ttc cgt ggc	atc gga cgc aac	6669
Val Asp Val Phe Cys Lys	Gly Thr Phe Arg Gly	Ile Gly Arg Asn	
2210	2215	2220	
tat cgc att gcc aag tgc	acg gcg gcc aaa tgc	gca ttg cgc caa	6714
Tyr Arg Ile Ala Lys Cys	Thr Ala Ala Lys Cys	Ala Leu Arg Gln	
2225	2230	2235	
ctc aaa aag cag ggc ttg	ata gcc aaa aaa gac	taa	6750
Leu Lys Lys Gln Gly Leu	Ile Ala Lys Lys Asp		
2240	2245		

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Thr Ile Ile Cys Leu Gly His Arg Ser Ser Lys Glu Phe Ile Ala Leu

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Ser	Val	Tyr	Leu	Ser	Cys	Glu	Val	Gly	Thr	Ser	Thr	Glu	Pro	Cys	Ser
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Ile	Tyr	Thr	Met	Leu	Thr	His	Leu	Thr	Asp	Leu	Arg	Val	Trp	Gln	Glu
				85					90					95	
Gln	Pro	Asp	Met	Gln	Ile	Pro	Phe	Asp	His	Cys	Trp	Thr	Asp	Tyr	His
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Val	Ser	Ile	Leu	Arg	Pro	Glu	Gly	Phe	Leu	Tyr	Leu	Leu	Glu	Thr	Arg
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Glu	Leu	Leu	Leu	Ser	Ser	Val	Glu	Leu	Ile	Val	Leu	Glu	Asp	Cys	His
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Asp	Ser	Ala	Val	Tyr	Gln	Arg	Ile	Arg	Pro	Leu	Phe	Glu	Asn	His	Ile
145					150					155					160
Met	Pro	Ala	Pro	Pro	Ala	Asp	Arg	Pro	Arg	Ile	Leu	Gly	Leu	Ala	Gly
				165					170					175	
Pro	Leu	His	Ser	Ala	Gly	Cys	Glu	Leu	Gln	Gln	Leu	Ser	Ala	Met	Leu
			180					185					190		
Ala	Thr	Leu	Glu	Gln	Ser	Val	Leu	Cys	Gln	Ile	Glu	Thr	Ala	Ser	Asp
		195					200					205			
Ile	Val	Thr	Val	Leu	Arg	Tyr	Cys	Ser	Arg	Pro	His	Glu	Tyr	Ile	Val
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Gln	Cys	Ala	Pro	Phe	Glu	Met	Asp	Glu	Leu	Ser	Leu	Val	Leu	Ala	Asp
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Val	Leu	Asn	Thr	His	Lys	Ser	Phe	Leu	Leu	Asp	His	Arg	Tyr	Asp	Pro
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Tyr	Glu	Ile	Tyr	Gly	Thr	Asp	Gln	Phe	Met	Asp	Glu	Leu	Lys	Asp	Ile
		260					265						270		
Pro	Asp	Pro	Lys	Val	Asp	Pro	Leu	Asn	Val	Ile	Asn	Ser	Leu	Leu	Val
		275					280					285			
Val	Leu	His	Glu	Met	Gly	Pro	Trp	Cys	Thr	Gln	Arg	Ala	Ala	His	His
	290					295					300				
Phe	Tyr	Gln	Cys	Asn	Glu	Lys	Leu	Lys	Val	Lys	Thr	Pro	His	Glu	Arg
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His	Tyr	Leu	Leu	Tyr	Cys	Leu	Val	Ser	Thr	Ala	Leu	Ile	Gln	Leu	Tyr
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Ser	Leu	Cys	Glu	His	Ala	Phe	His	Arg	His	Leu	Gly	Ser	Gly	Ser	Asp



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Ser	Arg	Gln	Thr	Ile	Glu	Arg	Tyr	Ser	Ser	Pro	Lys	Val	Arg	Arg	Leu		
355							360					365					
Leu	Gln	Thr	Leu	Arg	Cys	Phe	Lys	Pro	Glu	Glu	Val	His	Thr	Gln	Ala		
370							375				380						
Asp	Gly	Leu	Arg	Arg	Met	Arg	His	Gln	Val	Asp	Gln	Ala	Asp	Phe	Asn		
385							390					395				400	
Arg	Leu	Ser	His	Thr	Leu	Glu	Ser	Lys	Cys	Arg	Met	Val	Asp	Gln	Met		
							405					410				415	
Asp	Gln	Pro	Pro	Thr	Glu	Thr	Arg	Ala	Leu	Val	Ala	Thr	Leu	Glu	Gln		
							420					425				430	
Ile	Leu	His	Thr	Thr	Glu	Asp	Arg	Gln	Thr	Asn	Arg	Ser	Ala	Ala	Arg		
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Val	Thr	Pro	Thr	Pro	Thr	Pro	Ala	His	Ala	Lys	Pro	Lys	Pro	Ser	Ser		
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Gly	Ala	Asn	Thr	Ala	Gln	Pro	Arg	Thr	Arg	Arg	Arg	Val	Tyr	Thr	Arg		
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Arg	His	His	Arg	Asp	His	Asn	Asp	Gly	Ser	Asp	Thr	Leu	Cys	Ala	Leu		
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Ile	Tyr	Cys	Asn	Gln	Asn	His	Thr	Ala	Arg	Val	Leu	Phe	Glu	Leu	Leu		
500							505					510					
Ala	Glu	Ile	Ser	Arg	Arg	Asp	Pro	Asp	Leu	Lys	Phe	Leu	Arg	Cys	Gln		
515							520					525					
Tyr	Thr	Thr	Asp	Arg	Val	Ala	Asp	Pro	Thr	Thr	Glu	Pro	Lys	Glu	Ala		
530							535					540					
Glu	Leu	Glu	His	Arg	Arg	Gln	Glu	Glu	Val	Leu	Lys	Arg	Phe	Arg	Met		
545							550					555				560	
His	Asp	Cys	Asn	Val	Leu	Ile	Gly	Thr	Ser	Val	Leu	Glu	Glu	Gly	Ile		
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Asp	Val	Pro	Lys	Cys	Asn	Leu	Val	Val	Arg	Trp	Asp	Pro	Pro	Thr	Thr		
580							585					590					
Tyr	Arg	Ser	Tyr	Val	Gln	Cys	Lys	Gly	Arg	Ala	Arg	Ala	Ala	Pro	Ala		
595							600					605					
Tyr	His	Val	Ile	Leu	Val	Ala	Pro	Ser	Tyr	Lys	Ser	Pro	Thr	Val	Gly		
610							615					620					
Ser	Val	Gln	Leu	Thr	Asp	Arg	Ser	His	Arg	Tyr	Ile	Cys	Ala	Thr	Gly		
625							630					635				640	
Asp	Thr	Thr	Glu	Ala	Asp	Ser	Asp	Ser	Asp	Asp	Ser	Ala	Met	Pro	Asn		

645					650					655					
Ser	Ser	Gly	Ser	Asp	Pro	Tyr	Thr	Phe	Gly	Thr	Ala	Arg	Gly	Thr	Val
			660					665					670		
Lys	Ile	Leu	Asn	Pro	Glu	Val	Phe	Ser	Lys	Gln	Pro	Pro	Thr	Ala	Cys
		675					680					685			
Asp	Ile	Lys	Leu	Gln	Glu	Ile	Gln	Asp	Glu	Leu	Pro	Ala	Ala	Ala	Gln
	690					695					700				
Leu	Asp	Thr	Ser	Asn	Ser	Ser	Asp	Glu	Ala	Val	Ser	Met	Ser	Asn	Thr
705					710					715					720
Ser	Pro	Ser	Glu	Ser	Ser	Thr	Glu	Gln	Lys	Ser	Arg	Arg	Phe	Gln	Cys
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Glu	Leu	Ser	Ser	Leu	Thr	Glu	Pro	Glu	Asp	Thr	Ser	Asp	Thr	Thr	Ala
			740					745					750		
Glu	Ile	Asp	Thr	Ala	His	Ser	Leu	Ala	Ser	Thr	Thr	Lys	Asp	Leu	Val
		755					760					765			
His	Gln	Met	Ala	Gln	Tyr	Arg	Glu	Ile	Glu	Gln	Met	Leu	Leu	Ser	Lys
	770					775					780				
Cys	Ala	Asn	Thr	Glu	Pro	Pro	Glu	Gln	Glu	Gln	Ser	Glu	Ala	Glu	Arg
785					790					795					800
Phe	Ser	Ala	Cys	Leu	Ala	Ala	Tyr	Arg	Pro	Lys	Pro	His	Leu	Leu	Thr
				805					810					815	
Gly	Ala	Ser	Val	Asp	Leu	Gly	Ser	Ala	Ile	Ala	Leu	Val	Asn	Lys	Tyr
			820					825					830		
Cys	Ala	Arg	Leu	Pro	Ser	Asp	Thr	Phe	Thr	Lys	Leu	Thr	Ala	Leu	Trp
		835					840					845			
Arg	Cys	Thr	Arg	Asn	Glu	Arg	Ala	Gly	Val	Thr	Leu	Phe	Gln	Tyr	Thr
	850					855					860				
Leu	Arg	Leu	Pro	Ile	Asn	Ser	Pro	Leu	Lys	His	Asp	Ile	Val	Gly	Leu
865					870					875					880
Pro	Met	Pro	Thr	Gln	Thr	Leu	Ala	Arg	Arg	Leu	Ala	Ala	Leu	Gln	Ala
				885					890					895	
Cys	Val	Glu	Leu	His	Arg	Ile	Gly	Glu	Leu	Asp	Asp	Gln	Leu	Gln	Pro
			900					905					910		
Ile	Gly	Lys	Glu	Gly	Phe	Arg	Ala	Leu	Glu	Pro	Asp	Trp	Glu	Cys	Phe
		915					920					925			
Glu	Leu	Glu	Pro	Glu	Asp	Glu	Gln	Ile	Val	Gln	Leu	Ser	Asp	Glu	Pro
	930					935					940				
Arg	Pro	Gly	Thr	Thr	Lys	Arg	Arg	Gln	Tyr	Tyr	Tyr	Lys	Arg	Ile	Ala

945	950	955	960
Ser Glu Phe Cys Asp Cys Arg Pro Val Ala Gly Ala Pro Cys Tyr Leu			
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Tyr Phe Ile Gln Leu Thr Leu Gln Cys Pro Ile Pro Glu Glu Gln Asn			
	980	985	990
Thr Arg Gly Arg Lys Ile Tyr Pro Pro Glu Asp Ala Gln Gln Gly Phe			
	995	1000	1005
Gly Ile Leu Thr Thr Lys Arg Ile Pro Lys Leu Ser Ala Phe Ser			
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Ile Phe Thr Arg Ser Gly Glu Val Lys Val Ser Leu Glu Leu Ala			
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Lys Glu Arg Val Ile Leu Thr Ser Glu Gln Ile Val Cys Ile Asn			
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Gly Phe Leu Asn Tyr Thr Phe Thr Asn Val Leu Arg Leu Gln Lys			
	1055	1060	1065
Phe Leu Met Leu Phe Asp Pro Asp Ser Thr Glu Asn Cys Val Phe			
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Ile Val Pro Thr Val Lys Ala Pro Ala Gly Gly Lys His Ile Asp			
	1085	1090	1095
Trp Gln Phe Leu Glu Leu Ile Gln Ala Asn Gly Asn Thr Met Pro			
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Arg Ala Val Pro Asp Glu Glu Arg Gln Ala Gln Pro Phe Asp Pro			
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Gln Arg Phe Gln Asp Ala Val Val Met Pro Trp Tyr Arg Asn Gln			
	1130	1135	1140
Asp Gln Pro Gln Tyr Phe Tyr Val Ala Glu Ile Cys Pro His Leu			
	1145	1150	1155
Ser Pro Leu Ser Cys Phe Pro Gly Asp Asn Tyr Arg Thr Phe Lys			
	1160	1165	1170
His Tyr Tyr Leu Val Lys Tyr Gly Leu Thr Ile Gln Asn Thr Ser			
	1175	1180	1185
Gln Pro Leu Leu Asp Val Asp His Thr Ser Ala Arg Leu Asn Phe			
	1190	1195	1200
Leu Thr Pro Arg Tyr Val Asn Arg Lys Gly Val Ala Leu Pro Thr			
	1205	1210	1215
Ser Ser Glu Glu Thr Lys Arg Ala Lys Arg Glu Asn Leu Glu Gln			
	1220	1225	1230
Lys Gln Ile Leu Val Pro Glu Leu Cys Thr Val His Pro Phe Pro			

1235	1240	1245
Ala Ser Leu Trp Arg Thr 1250	Ala Val Cys Leu Pro 1255	Cys Ile Leu Tyr 1260
Arg Ile Asn Gly Leu Leu 1265	Leu Ala Asp Asp Ile 1270	Arg Lys Gln Val 1275
Ser Ala Asp Leu Gly Leu 1280	Gly Arg Gln Gln Ile 1285	Glu Asp Glu Asp 1290
Phe Glu Trp Pro Met Leu 1295	Asp Phe Gly Trp Ser 1300	Leu Ser Glu Val 1305
Leu Lys Lys Ser Arg Glu 1310	Ser Lys Gln Lys Glu 1315	Ser Leu Lys Asp 1320
Asp Thr Ile Asn Gly Lys 1325	Asp Leu Ala Asp Val 1330	Glu Lys Lys Pro 1335
Thr Ser Glu Glu Thr Gln 1340	Leu Asp Lys Asp Ser 1345	Lys Asp Asp Lys 1350
Val Glu Lys Ser Ala Ile 1355	Glu Leu Ile Ile Glu 1360	Gly Glu Glu Lys 1365
Leu Gln Glu Ala Asp Asp 1370	Phe Ile Glu Ile Gly 1375	Thr Trp Ser Asn 1380
Asp Met Ala Asp Asp Ile 1385	Ala Ser Phe Asn Gln 1390	Glu Asp Asp Asp 1395
Glu Asp Asp Ala Phe His 1400	Leu Pro Val Leu Pro 1405	Ala Asn Val Lys 1410
Phe Cys Asp Gln Gln Thr 1415	Arg Tyr Gly Ser Pro 1420	Thr Phe Trp Asp 1425
Val Ser Asn Gly Glu Ser 1430	Gly Phe Lys Gly Pro 1435	Lys Ser Ser Gln 1440
Asn Lys Gln Gly Gly Lys 1445	Gly Lys Ala Lys Gly 1450	Pro Ala Lys Pro 1455
Thr Phe Asn Tyr Tyr Asp 1460	Ser Asp Asn Ser Leu 1465	Gly Ser Ser Tyr 1470
Asp Asp Asp Asp Asn Ala 1475	Gly Pro Leu Asn Tyr 1480	Met His His Asn 1485
Tyr Ser Ser Asp Asp Asp 1490	Asp Val Ala Asp Asp 1495	Ile Asp Ala Gly 1500
Arg Ile Ala Phe Thr Ser 1505	Lys Asn Glu Ala Glu 1510	Thr Ile Glu Thr 1515
Ala Gln Glu Val Glu Lys 1520	Arg Gln Lys Gln Leu 1525	Ser Ile Ile Gln 1530

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Ala Thr Asn Ala Asn Glu Arg Gln Tyr Gln Gln Thr Lys Asn Leu				
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Leu Ile Gly Phe Asn Phe Lys His Glu Asp Gln Lys Glu Pro Ala				
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Thr Ile Arg Tyr Glu Glu Ser Ile Ala Lys Leu Lys Thr Glu Ile				
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Glu Ser Gly Gly Met Leu Val Pro His Asp Gln Gln Leu Val Leu				
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Lys Arg Ser Asp Ala Ala Glu Ala Gln Val Ala Lys Val Ser Met				
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Met Glu Leu Leu Lys Gln Leu Leu Pro Tyr Val Asn Glu Asp Val				
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Leu Ala Lys Lys Leu Gly Asp Arg Arg Glu Leu Leu Leu Ser Asp				
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Leu Val Glu Leu Asn Ala Asp Trp Val Ala Arg His Glu Gln Glu				
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Thr Tyr Asn Val Met Gly Cys Gly Asp Ser Phe Asp Asn Tyr Asn				
1655		1660		1665
Asp His His Arg Leu Asn Leu Asp Glu Lys Gln Leu Lys Leu Gln				
1670		1675		1680
Tyr Glu Arg Ile Glu Ile Glu Pro Pro Thr Ser Thr Lys Ala Ile				
1685		1690		1695
Thr Ser Ala Ile Leu Pro Ala Gly Phe Ser Phe Asp Arg Gln Pro				
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Asp Leu Val Gly His Pro Gly Pro Ser Pro Ser Ile Ile Leu Gln				
1715		1720		1725
Ala Leu Thr Met Ser Asn Ala Asn Asp Gly Ile Asn Leu Glu Arg				
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Leu Glu Thr Ile Gly Asp Ser Phe Leu Lys Tyr Ala Ile Thr Thr				
1745		1750		1755
Tyr Leu Tyr Ile Thr Tyr Glu Asn Val His Glu Gly Lys Leu Ser				
1760		1765		1770
His Leu Arg Ser Lys Gln Val Ala Asn Leu Asn Leu Tyr Arg Leu				
1775		1780		1785
Gly Arg Arg Lys Arg Leu Gly Glu Tyr Met Ile Ala Thr Lys Phe				
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Glu Pro His Asp Asn Trp Leu Pro Pro Cys Tyr Tyr Val Pro Lys				

1805	1810	1815
Glu Leu Glu Lys Ala Leu 1820	Ile Glu Ala Lys Ile 1825	Pro Thr His His 1830
Trp Lys Leu Ala Asp Leu 1835	Leu Asp Ile Lys Asn 1840	Leu Ser Ser Val 1845
Gln Ile Cys Glu Met Val 1850	Arg Glu Lys Ala Asp 1855	Ala Leu Gly Leu 1860
Glu Gln Asn Gly Gly Ala 1865	Gln Asn Gly Gln Leu 1870	Asp Asp Ser Asn 1875
Asp Ser Cys Asn Asp Phe 1880	Ser Cys Phe Ile Pro 1885	Tyr Asn Leu Val 1890
Ser Gln His Ser Ile Pro 1895	Asp Lys Ser Ile Ala 1900	Asp Cys Val Glu 1905
Ala Leu Ile Gly Ala Tyr 1910	Leu Ile Glu Cys Gly 1915	Pro Arg Gly Ala 1920
Leu Leu Phe Met Ala Trp 1925	Leu Gly Val Arg Val 1930	Leu Pro Ile Thr 1935
Arg Gln Leu Asp Gly Gly 1940	Asn Gln Glu Gln Arg 1945	Ile Pro Gly Ser 1950
Thr Lys Pro Asn Ala Glu 1955	Asn Val Val Thr Val 1960	Tyr Gly Ala Trp 1965
Pro Thr Pro Arg Ser Pro 1970	Leu Leu His Phe Ala 1975	Pro Asn Ala Thr 1980
Glu Glu Leu Asp Gln Leu 1985	Leu Ser Gly Phe Glu 1990	Glu Phe Glu Glu 1995
Ser Leu Gly Tyr Lys Phe 2000	Arg Asp Arg Ser Tyr 2005	Leu Leu Gln Ala 2010
Met Thr His Ala Ser Tyr 2015	Thr Pro Asn Arg Leu 2020	Thr Asp Cys Tyr 2025
Gln Arg Leu Glu Phe Leu 2030	Gly Asp Ala Val Leu 2035	Asp Tyr Leu Ile 2040
Thr Arg His Leu Tyr Glu 2045	Asp Pro Arg Gln His 2050	Ser Pro Gly Ala 2055
Leu Thr Asp Leu Arg Ser 2060	Ala Leu Val Asn Asn 2065	Thr Ile Phe Ala 2070
Ser Leu Ala Val Arg His 2075	Gly Phe His Lys Phe 2080	Phe Arg His Leu 2085
Ser Pro Gly Leu Asn Asp Val	Ile Asp Arg Phe Val	Arg Ile Gln

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Gln Glu Asn Gly His Cys Ile Ser Glu Glu Tyr Tyr Leu Leu Ser		
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Glu Glu Glu Cys Asp Asp Ala Glu Asp Val Glu Val Pro Lys Ala		
2120	2125	2130
Leu Gly Asp Val Phe Glu Ser Ile Ala Gly Ala Ile Phe Leu Asp		
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Ser Asn Met Ser Leu Asp Val Val Trp His Val Tyr Ser Asn Met		
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Met Ser Pro Glu Ile Glu Gln Phe Ser Asn Ser Val Pro Lys Ser		
2165	2170	2175
Pro Ile Arg Glu Leu Leu Glu Leu Glu Pro Glu Thr Ala Lys Phe		
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Gly Lys Pro Glu Lys Leu Ala Asp Gly Arg Arg Val Arg Val Thr		
2195	2200	2205
Val Asp Val Phe Cys Lys Gly Thr Phe Arg Gly Ile Gly Arg Asn		
2210	2215	2220
Tyr Arg Ile Ala Lys Cys Thr Ala Ala Lys Cys Ala Leu Arg Gln		
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Leu Lys Lys Gln Gly Leu Ile Ala Lys Lys Asp		
2240	2245	

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 Ala Ser Gly Phe Gln Gln Gly Gly Gln Gln Lys Ser Gln Asp Ala  
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 Glu Gly Trp Thr Ala Gln Lys Lys Gln Gly Lys Gln Gln Val Gln Gly

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Pro	Gly	Gln	Gln	Gln	Gly	Gly	His	Gln	Gln	Gly	Arg	Gln	Gly	Gln	Glu
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Gly	Gly	Tyr	Gln	Gln	Arg	Pro	Ser	Gly	Gln	Gln	Gln	Gly	Gly	His	Gln
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Gln	Gly	Arg	Gln	Gly	Gln	Glu	Gly	Gly	Tyr	Gln	Gln	Arg	Pro	Pro	Gly
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Gln	Gln	Gln	Gly	Gly	His	Gln	Gln	Gly	Arg	Gln	Gly	Gln	Glu	Gly	Gly
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Tyr	Gln	Gln	Arg	Pro	Ser	Gly	Gln	Gln	Gln	Gly	Gly	His	Gln	Gln	Gly
225							230					235			240
Arg	Gln	Gly	Gln	Glu	Gly	Gly	Tyr	Gln	Gln	Arg	Pro	Ser	Gly	Gln	Gln
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Gln	Gly	Gly	His	Gln	Gln	Gly	Arg	Gln	Gly	Gln	Glu	Gly	Gly	Tyr	Gln
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Gln	Arg	Pro	Ser	Gly	Gln	Gln	Gln	Gly	Gly	His	Gln	Gln	Gly	Arg	Gln
		275					280						285		
Gly	Gln	Glu	Gly	Gly	Tyr	Gln	Gln	Arg	Pro	Pro	Gly	Gln	Gln	Pro	Asn
		290					295					300			
Gln	Thr	Gln	Ser	Gln	Gly	Gln	Tyr	Gln	Ser	Arg	Gly	Pro	Pro	Gln	Gln
305							310					315			320
Gln	Gln	Ala	Ala	Pro	Leu	Pro	Leu	Pro	Pro	Gln	Pro	Ala	Gly	Ser	Ile
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Lys	Arg	Gly	Thr	Ile	Gly	Lys	Pro	Gly	Gln	Val	Gly	Ile	Asn	Tyr	Leu
			340					345					350		
Asp	Leu	Asp	Leu	Ser	Lys	Met	Pro	Ser	Val	Ala	Tyr	His	Tyr	Asp	Val
		355					360					365			
Lys	Ile	Met	Pro	Glu	Arg	Pro	Lys	Lys	Phe	Tyr	Arg	Gln	Ala	Phe	Glu
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Gln	Phe	Arg	Val	Asp	Gln	Leu	Gly	Gly	Ala	Val	Leu	Ala	Tyr	Asp	Gly
385							390					395			400
Lys	Ala	Ser	Cys	Tyr	Ser	Val	Asp	Lys	Leu	Pro	Leu	Asn	Ser	Gln	Asn



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Pro	Glu	Val	Thr	Val	Thr	Asp	Arg	Asn	Gly	Arg	Thr	Leu	Arg	Tyr	Thr
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Ile	Glu	Ile	Lys	Glu	Thr	Gly	Asp	Ser	Thr	Ile	Asp	Leu	Lys	Ser	Leu
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Thr	Thr	Tyr	Met	Asn	Asp	Arg	Ile	Phe	Asp	Lys	Pro	Met	Arg	Ala	Met
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Gln	Cys	Val	Glu	Val	Val	Leu	Ala	Ser	Pro	Cys	His	Asn	Lys	Ala	Ile
465					470					475					480
Arg	Val	Gly	Arg	Ser	Phe	Phe	Lys	Met	Ser	Asp	Pro	Asn	Asn	Arg	His
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Glu	Leu	Asp	Asp	Gly	Tyr	Glu	Ala	Leu	Val	Gly	Leu	Tyr	Gln	Ala	Phe
			500					505					510		
Met	Leu	Gly	Asp	Arg	Pro	Phe	Leu	Asn	Val	Asp	Ile	Ser	His	Lys	Ser
			515				520					525			
Phe	Pro	Ile	Ser	Met	Pro	Met	Ile	Glu	Tyr	Leu	Glu	Arg	Phe	Ser	Leu
			530				535					540			
Lys	Ala	Lys	Ile	Asn	Asn	Thr	Thr	Asn	Leu	Asp	Tyr	Ser	Arg	Arg	Phe
545				550						555					560
Leu	Glu	Pro	Phe	Leu	Arg	Gly	Ile	Asn	Val	Val	Tyr	Thr	Pro	Pro	Gln
				565				570					575		
Ser	Phe	Gln	Ser	Ala	Pro	Arg	Val	Tyr	Arg	Val	Asn	Gly	Leu	Ser	Arg
			580					585					590		
Ala	Pro	Ala	Ser	Ser	Glu	Thr	Phe	Glu	His	Asp	Gly	Lys	Lys	Val	Thr
			595				600					605			
Ile	Ala	Ser	Tyr	Phe	His	Ser	Arg	Asn	Tyr	Pro	Leu	Lys	Phe	Pro	Gln
			610				615					620			
Leu	His	Cys	Leu	Asn	Val	Gly	Ser	Ser	Ile	Lys	Ser	Ile	Leu	Leu	Pro
625				630						635					640
Ile	Glu	Leu	Cys	Ser	Ile	Glu	Glu	Gly	Gln	Ala	Leu	Asn	Arg	Lys	Asp
				645					650					655	
Gly	Ala	Thr	Gln	Val	Ala	Asn	Met	Ile	Lys	Tyr	Ala	Ala	Thr	Ser	Thr
			660					665					670		
Asn	Val	Arg	Lys	Arg	Lys	Ile	Met	Asn	Leu	Leu	Gln	Tyr	Phe	Gln	His
			675				680					685			
Asn	Leu	Asp	Pro	Thr	Ile	Ser	Arg	Phe	Gly	Ile	Arg	Ile	Ala	Asn	Asp
			690				695					700			
Phe	Ile	Val	Val	Ser	Thr	Arg	Val	Leu	Ser	Pro	Pro	Gln	Val	Glu	Tyr

705	710	715	720
His Ser Lys Arg Phe Thr Met Val Lys Asn Gly Ser Trp Arg Met Asp	725	730	735
Gly Met Lys Phe Leu Glu Pro Lys Pro Lys Ala His Lys Cys Ala Val	740	745	750
Leu Tyr Cys Asp Pro Arg Ser Gly Arg Lys Met Asn Tyr Thr Gln Leu	755	760	765
Asn Asp Phe Gly Asn Leu Ile Ile Ser Gln Gly Lys Ala Val Asn Ile	770	775	780
Ser Leu Asp Ser Asp Val Thr Tyr Arg Pro Phe Thr Asp Asp Glu Arg	785	790	795
Ser Leu Asp Thr Ile Phe Ala Asp Leu Lys Arg Ser Gln His Asp Leu	805	810	815
Ala Ile Val Ile Ile Pro Gln Phe Arg Ile Ser Tyr Asp Thr Ile Lys	820	825	830
Gln Lys Ala Glu Leu Gln His Gly Ile Leu Thr Gln Cys Ile Lys Gln	835	840	845
Phe Thr Val Glu Arg Lys Cys Asn Asn Gln Thr Ile Gly Asn Ile Leu	850	855	860
Leu Lys Ile Asn Ser Lys Leu Asn Gly Ile Asn His Lys Ile Lys Asp	865	870	875
Asp Pro Arg Leu Pro Met Met Lys Asn Thr Met Tyr Ile Gly Ala Asp	885	890	895
Val Thr His Pro Ser Pro Asp Gln Arg Glu Ile Pro Ser Val Val Gly	900	905	910
Val Ala Ala Ser His Asp Pro Tyr Gly Ala Ser Tyr Asn Met Gln Tyr	915	920	925
Arg Leu Gln Arg Gly Ala Leu Glu Glu Ile Glu Asp Met Phe Ser Ile	930	935	940
Thr Leu Glu His Leu Arg Val Tyr Lys Glu Tyr Arg Asn Ala Tyr Pro	945	950	955
Asp His Ile Ile Tyr Tyr Arg Asp Gly Val Ser Asp Gly Gln Phe Pro	965	970	975
Lys Ile Lys Asn Glu Glu Leu Arg Cys Ile Lys Gln Ala Cys Asp Lys	980	985	990
Val Gly Cys Lys Pro Lys Ile Cys Cys Val Ile Val Val Lys Arg His	995	1000	1005
His Thr Arg Phe Phe Pro Ser Gly Asp Val Thr Thr Ser Asn Lys			

1010	1015	1020
Phe Asn Asn Val Asp Pro Gly Thr Val Val Asp Arg Thr Ile Val 1025 1030 1035		
His Pro Asn Glu Met Gln Phe Phe Met Val Ser Gly Gln Ala Ile 1040 1045 1050		
Gln Gly Thr Ala Lys Pro Thr Arg Tyr Asn Val Ile Glu Asn Thr 1055 1060 1065		
Gly Asn Leu Asp Ile Asp Leu Leu Gln Gln Leu Thr Tyr Asn Leu 1070 1075 1080		
Cys His Met Phe Pro Arg Cys Asn Arg Ser Val Ser Tyr Pro Ala 1085 1090 1095		
Pro Ala Tyr Leu Ala His Leu Val Ala Ala Arg Gly Arg Val Tyr 1100 1105 1110		
Leu Thr Gly Thr Asn Arg Phe Leu Asp Leu Lys Lys Glu Tyr Ala 1115 1120 1125		
Lys Arg Thr Ile Val Pro Glu Phe Met Lys Lys Asn Pro Met Tyr 1130 1135 1140		
Phe Val 1145		